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## GEOGRAPHICAL RECORD.

### AFRICA.

ITALIANS IN ERITREA.—The *Bollettino dell' Emigrazione* (No. 16, 1906) prints the conclusions reached by the Commission sent to the African colony of Eritrea by the Co-operative Society of Ravenna to study the question whether this part of East Africa is adapted for Italian colonisation. The Commission reports that below 1,800 meters the climate is not suitable for white labourers; that above 2,000 meters the climate is too cold for the industrial plants; but between these altitudes the conditions are as salubrious and as suitable for agriculture as any in Italy. It is found, however, that though this land is abundant, it is already occupied by the aborigines, who farm it in a very wasteful manner, removing to new fields when they have exhausted the land they are cultivating. The Commission suggests that the Italian Government should insist upon the natives learning proper methods of cultivating the soil and that the free Government lands should be allotted to white settlers to cultivate and restore to its proper condition. Settlers are advised to turn their attention to such industrial plants as tobacco, sisal hemp, upland cotton, and other textile plants. Careful experiments are being carried out on the plateau at Asmara and elsewhere with these and other plants.

NORTH-EASTERN RHODESIA.—Mr. L. A. Wallace, Chief Surveyor to the British South Africa Company in North-Eastern Rhodesia, contributed to the April number of the *Geographical Journal* a valuable paper on that region. At present there are over 5,000 miles of astronomically-surveyed routes. He has a high opinion of the economic value of the country. Its rich cotton soil is probably its best recommendation. This soil is said to be ideal for cotton, and samples of native cotton have been valued in England at from 14 to 16 cents per pound. There are also extensive forests of useful timber and rich mines of copper, lead, and zinc. A very large area of good farming land is distributed through the whole of the highlands.

The eastern half of the country is formed of granite and schists, and running through the middle of this area from northeast to southwest is the deep, narrow valley of Luangaa, at the head of which, in the highest land in the country, are the Mount Waller sandstones and coal measures of Permian age. In the western half of the region are seen, first, in the high land to the northwest, a large area covered by Tanganyika sandstone in places up to 3,000 feet thick, without coal or lime. Next, in the southeast, is an area of crystalline limestones, much folded, and isolated from the rocks on the east by fifty miles of granite.

AN INDEX RELATING TO NORTH AFRICA.—The *Bulletin* of the Geographical Society of Algiers (1906, No. 3) is wholly given to an index of its contents for the years from July, 1896, to Dec. 31, 1905. The material is arranged under names of authors, places, and topics. As the periodical is especially devoted to North Africa and the Sahara, the index will be helpful in consulting much recent literature relating to that part of the continent.

## AMERICA.

THE TOPOGRAPHIC ATLAS.—The topographic map of the United States will be advanced this season by work in 31 States and 4 Territories. All the parties are now in the field. Two topographic parties are engaged in Alaska making detailed maps of the Fairbanks mining district on the middle Tanana River, and of the Kasaan peninsula on Prince of Wales Island in southeastern Alaska, on a scale of a mile to the inch. The region lying between the international boundary west of Dawson and Fairbanks, adjoining the southern boundary of an area already mapped, will be surveyed on a scale of one half inch to a mile. All plans for the season's work in the various States and Territories have been formed, excepting in New York and Pennsylvania, which are still under consideration.

POPULATION OF THE UNITED STATES.—*Bulletin 71* of the Bureau of the Census gives estimates of the population of the United States for 1904, 1905, and 1906. The estimated population of the country in 1906 was 84,216,433, of whom 83,941,510 lived in the continental United States. In 1906, the number of inhabitants per square mile in the continental United States was 28, varying from 1 in Arizona and Wyoming to 460 in Rhode Island. Less than one person per square mile lives in Nevada. If the density of population in all the States were as great as it is in Rhode Island, the total population of the United States would approximately equal the entire population of the world. The estimated population of the United States and outlying territory in 1906 was 93,182,240.

SUB-IRRIGATION.—The growth of population has at length compelled America to follow the example of the hoary nations of the East in the matter of irrigation. Within a score of years it is probable that practically all of the land available for irrigation under the present system will have been utilized. The demand for new farm-land, however, is likely to be as strong as ever. It will be stronger, indeed, if, as many people think, we are destined to have a population of 200 million by 1950 and of 300 million by 2000 A. D. Hence any plan which will make it possible to avoid the enormous waste of water involved in our present system of irrigation is worthy of careful consideration. In the arid southwest we have millions of acres of almost level land which could be transformed from a desert into a garden if, in the first place, there were sufficient water, and if, in the second place, the cost of raising it to the necessary level were not so enormous. Measurements show that in ordinary irrigation projects more than half the water is lost by evaporation and seepage between the heads of the main canals and the point of final distribution to the fields. A far more serious loss, estimated at from five to twenty-five times as great, is involved in the enormous evaporation from the fields where the water is ultimately spread out upon the surface under the rays of a hot sun. Manifestly, if these two sources of loss could be removed, the present supply of water would be sufficient for from five to fifty times as much land as it now is; and the cost per acre of raising it by mechanical means to the elevation of the land now lying waste would be proportionally less. To put it mildly, it would be possible to double or treble the amount of land redeemable from the desert.

W. B. Rice, writing in the *Irrigation Age* for April, believes that sub-irrigation presents a practicable means of preventing the present deplorable loss of water. The method has been used in a few places where intensive cultivation is practised, but has been deemed impracticable on a large scale because of the great expense

involved, and because of the difficulties due to the accumulation of sediment in the underground conduits. In view, however, of the fact that ordinary irrigated land is worth \$100 an acre, and the best land several times as much, Mr. Rice believes that the expense of sub-irrigation is not prohibitive. In the ideal scheme the water must first be freed from sediment in settling basins.

It is then led into a system of tile pipes—say two inches in diameter and six feet apart—underlying each field at a convenient depth. The water percolates out between the short, loosely-joined tiles and saturates the fields. The surface, however, remains dry, and evaporation except through growing vegetation is largely prevented by an inch or two of dusty soil on top. Water can stand in the tiles till the required degree of saturation is obtained. Being enclosed in pipes it can flow up and down over gentle irregularities, and the cost of levelling up the fields is avoided. Weeds have a poor chance to grow, because the seeds of most of them fall into the dry surface-layer of soil and cannot sprout. Thus the expense of keeping them down is lessened. Moreover, the deterioration which at present arises from the saline deposits consequent on extensive evaporation is almost avoided. Thus, again, the value of sub-irrigated land becomes greater than that of ordinary irrigated land. The original cost of tiling an acre for sub-irrigation amounts to about \$60, according to Rice's estimate. It is quite possible that this is too small. Nevertheless, even if the cost is much more than \$60, sub-irrigation is likely ere long to become practicable. A plan which holds out a reasonable possibility of adding millions of acres to the habitable area of the earth cannot be dismissed merely because it presents difficulties. E. H.

REPORT ON LEAD AND ZINC.—Vol. VIII of the Publications of the University Geological Survey of Kansas is a special report on lead and zinc prepared by Prof. E. Haworth, State Geologist, Drs. Crane and Rogers, and volunteer assistants. The book, of nearly 550 pp., is divided into three parts, of which the first, by Dr. Haworth, treats of lead and zinc ores in their history, distribution, compounds, geology, and theories of ore formation. The second part, by Dr. Crane, is devoted to methods of prospecting, mining, and milling in the Kansas lead and zinc district, to descriptions of machinery, and to suggestions and information relating to the industry. The third part is a description by Dr. Rogers of the minerals of the Galena-Joplin lead and zinc district. The State line is disregarded, as these parts of southeastern Kansas and southwestern Missouri constitute a distinct mineralogical province, so that the discussion of their minerals includes the district as a whole. Dr. Rogers deals largely with crystallography, as this part of the subject has been most neglected. Most of the drawings are his own. The volume is illustrated with photographs of ores, machinery, landscapes, mining plants, a few maps, and many figures in text.

SURFACE WATERS IN MINNESOTA.—The general characteristics of Minnesota's streams and lakes and the various factors that modify the quality of the drainage are discussed by R. B. Dole and F. F. Wesbrook in Water Supply and Irrigation Paper No. 193. The results of nearly two-years' field and laboratory work by the U. S. Geological Survey and the Minnesota State Board of Health are included. The discussions embrace the general features that influence the quality of the water, each drainage area considered in detail, and the results of chemical analyses and bacteriological examinations. Minnesota contains the head-waters of three great drainage systems. About one-tenth of her area is tributary to Lake Superior, three-tenths to Hudson Bay, and six-tenths to the

Mississippi system. The State contains probably a larger number of lakes than any other State in the Union. The latest authority gives 3,824 square miles as the area covered by water.

**FIFTH REPORT OF THE RECLAMATION SERVICE.**—This report relates particularly to operations during the fiscal year ending June 30, 1906. In view of the demand for facts concerning the character and cost of the works, considerable data, more or less technical, desired by engineers and others are included. Among the projects reported upon are: The irrigation of 200,000 acres in the Salt River Valley, Arizona; work in the Sacramento Valley, where the area adapted for irrigation exceeds 2,000,000 acres; that near Yuma in California-Arizona, where the Colorado will be diverted into two irrigation channels, one on each side of the river; that in Uncompahgre Valley, Colorado, where about 60,000 acres of fruit lands and 80,000 acres of general farming lands will be irrigated; the Minidoka project for the reclamation of 150,000 acres in the Central Snake River Valley, Idaho; the Payette-Boise project, Idaho, where 272,000 acres in those valleys are to be reclaimed; and the Shoshone project, which provides for the irrigation of a large area near Cody, Wyoming. The reports are illustrated by many photographs, maps, and profiles.

**AGRICULTURE IN THE PEACE RIVER COUNTRY.**—The farming activities of the Canadian Plains are extending every year a little further to the north. In 1902 there was an increasing request for reliable information as to the Peace River country. Dr. Robert Bell, then in charge of the Geological Survey of Canada, therefore requested Mr. James Macoun to undertake an investigation of the Peace River country, and to ascertain the true character of the land and the climate of the upper or western portion of the region. Mr. Macoun started on this journey early in 1903.

In his summary report, published in Vol. XV of the Annual Reports, he said that he found the value of the Peace River to be all that previous visitors had represented it to be, but the cultivatable area in the valley itself is so small that it is not worth considering in a report on the whole region. On the upper Peace River plateau, which is from 800 to 1,000 feet above the river and from 2,300 to 3,500 feet above the sea, the only part that is likely to be touched by railroad for many years is about 7,000,000 acres of prairie or bluff country. The soil, a rich black loam, is of great fertility, but of varying depth. It is rich in humus compounds and in nitrogen, equalling in these respects much of the fertile prairie soil of Manitoba.

The country south of the river, including Grande Prairie, is probably a little warmer than that to the north of the river between Dunvegan and Peace River Landing. The whole of the upper country is well suited for cattle-raising during the summer, as the ground is covered with luxuriant grasses and other fodder plants; but the winters are long, and hay must be fed for fully four months. There is abundant poplar and spruce for house-building, fencing, and firewood, but no timber suitable for railway construction except for ties.

In the neighbourhood of Fort Vermilion (on the middle Peace River in 116° W. Long.) the climate is much better than in the upper Peace River region. This is due chiefly to the fact that the elevation is about 1,500 feet lower than at Grande Prairie and the district about Dunvegan. Wheat ripens here in about three years out of five, and barley and oats are seldom touched by frost.

**THE JAMAICA EARTHQUAKE.**—One of the clearest descriptions of the phenomena

associated with the Jamaica earthquake is that recently published in the *Popular Science Monthly* (Vol. LXX, May, 1907, pp. 385-403) by Professor Chas. W. Brown, who made a special expedition to study the earthquake effects. Prof. Brown points out that the earthquake was confined, in its area of greatest destruction, to small limits upon alluvial ground. A large part of the paper is given up to a description of the earthquake itself and its effects upon the buildings. Some of his illustrations are very striking. He states that in the closely-built city of Kingston, numbering about 60,000 inhabitants, about 85% of the buildings were injured or destroyed. Between January 14th and February 5th eighty shocks were noticed, and others have occurred since.

One of the most interesting parts of Professor Brown's paper is that describing the local changes in the surface features. He states that there was a zone of fissuring and subsidence from 100 to 300 yards in width, starting at the western part of the city, running along the water front, encircling the harbour, and continuing along the line of the Palisadoes, reaching greatest destruction at Port Royal. Soundings show that in several places along the edge of the harbour the bottom sank from a depth of one fathom to over six fathoms; and that on the harbour side of the base of the Palisadoes a series of step faults occurred, with a maximum depression of four fathoms. The greatest destruction along this zone of subsidence was at the western tip of Port Royal, where the buildings were tilted by the sinking, and 100 yards, more or less, were submerged from a depth of 8 to 25 feet. He states that "this fissuring of the earth was caused by the rapid tearing apart and closing of the earth's crust, accompanied generally by the ejection of water, sand, and mud, sometimes to the height of three or four feet; but the subsidence prevented the formation of any cones about these craterlets. The sands first thrown up were afterwards covered by a layer of mud." This peculiar subsidence is difficult of explanation, for it occurred along the rim of the harbour, while the middle portions of the harbour were stable, and the channel was unchanged.

R. S. T.

**CARRYING SAO PAULO COFFEE TO THE SEA.**—Consul-General Anderson, of Brazil, writes to our Bureau of Manufactures that the State of São Paulo, embracing about one-fortieth of the territory of Brazil, produces 40 per cent. of the Republic's exports. This is because São Paulo is the greatest coffee-raising region in the country. The exports pass to the coasts over the Santos-São Paulo Railroad, which is probably the most profitable investment of the kind in the world. For many miles in the interior, between successive coffee plantations, the branch lines reach out for coffee. The railroad lowers these exports about 3,000 feet down the mountain-side to Santos. For days at a time the road carries over 100,000 bags of coffee a day, each bag weighing 132 pounds. The grade is so steep that ordinary railroading is out of the question. The cable system is therefore employed. On the mountain-side the locomotives are fitted with cable grips and the cables are operated from stations very much as ordinary cable street railroads in the United States are operated. The business of the road is enormous, as it carries not only the coffee crop to the sea but also nine-tenths of the imports received at the port of Santos.

#### ASIA.

**A RAILROAD FROM THE OB RIVER TO THE ARCTIC OCEAN.**—The British Embassy at St. Petersburg reports that the Russian Commission on New Railroads has

decided in favour of the construction of the Polar-Ural Railroad (so called because it will cross the Ural Mountains). It will connect with the river systems of the Ob and Yenisei, and is expected to be the chief route for the export of Siberian raw material to Europe and for the import into Siberia of European goods. The chief commercial centres of western Siberia—Tobolsk, Omsk, Semipalatinsk, the station of Ob, Barnoul, Tomsk, and Krasnoyarsk—will thus be in connection with European ports by a railway from Sob, on the left bank of the Ob (30 versts south of Obdorsk), to Varandai Bay, on the Samoyed shore of the Arctic Ocean. The length of the railroad will be about 266 miles. The length of the river route from the station of Ob, the central commercial point of western Siberia, to the station of Sob is about 1,600 miles. The length of the sea route from Varandai Bay to London, Antwerp, and Hamburg is from 4,600 to 5,666 miles. Thus the rail carriage of freight by this route will be only about 4 per cent. of the whole, whereas by the usual transit routes it forms from 25 to 80 per cent. Navigation along the Murman coast may be considered as perfectly safe from three and a half to four months a year. The cost of building the railroad is estimated at 40,000,000 rubles.

THE JAPANESE IN SOUTHERN SAKHALIN.—*Ost-Asien* (No. 104, 1907) says that, though less than two years have elapsed since the Japanese landed troops in south Sakhalin in sufficient number to take effective possession of the coast, there are now about 15,000 Japanese living there. It will be remembered that the treaty of peace between Japan and Russia gave to the Japanese all that part of the island lying south of 50° N. Lat. (*Bull.*, 1905, pp. 724-26). In Korsakovsk there are now more than 600 houses and a school with a department for high-school studies, a post office, and a telegraph office. A fine wagon road has been built from Korsakovsk to Vladimirovka, about thirty miles, and the road is now being extended northwest across the mountains to the west coast port of Manka. A considerable number of peasant farmers have left Japan to make new homes on the island, and the Government is doing all it can for their welfare, and believes that agriculture may be successfully developed. The sum of \$135,000 has thus far been appropriated for road-building, and the Government says that south Sakhalin is to be as well provided with good highways as the neighbouring island of Hokkaido. The excellent fisheries around the southern part of Sakhalin are employing many men, and the Government received last year over \$250,000 by leasing fishing stations along the coast.

#### POLAR.

THE MIKKELSEN-LEFFINGWELL EXPEDITION.—A telegram from Victoria, B. C., on June 22, said:

A trader from Rampart-house, Porcupine River, has arrived at Cadzow with news of the Mikkelsen-Leffingwell Arctic Expedition. Captain Mikkelsen reached Herschel Island in April, and reported that the *Duchess of Bedford* was icebound 150 miles to the northwest, close to land. He returned to the schooner at the end of April, and said that he intended to attempt navigating further north. He reported all well.

It is evident from the above despatch that the expedition's vessel was still frozen in at her winter quarters at Flaxman Island. There is little probability, in average ice conditions there, that she got away for her journey to Banks Land before July or August. Captain Mikkelsen's letter to the Society, written last fall, was printed in the April number of the *BULLETIN*.

#### CARTOGRAPHIC.

REPRODUCTION OF EARLY MAPS.—A plan has been perfected for the reproduction, in the exact size of the originals, of a number of the important early maps which

illustrate the gradual expansion of knowledge concerning the geography of the New World. The series is being issued under the joint auspices of the Hispanic Society of America and the American Geographical Society, and under the direction of Professor Edward Luther Stevenson, of Rutgers College. The maps to be published include some which have only recently become known, besides a number of those familiar by name but not readily accessible. The first of the series is now ready for distribution.

This is the "Hondius World Map," the work of Jodocus Hondius, the distinguished cartographer and engraver. It could not have been drawn later than 1611. In comparison with the Waldseemüller World Map of 1507 it exhibits forcibly the progress in map-making during a century. In size the map is 160 by 246 cm.

Jodocus Hondius was the last of the three distinguished geographers and map-makers—Ortelius, Mercator, Hondius. This large World Map was probably his final, as it certainly is his greatest work, and is, therefore, an important landmark in the history of cartography.

The map was found by Professor Joseph Fischer, S.J., in the library of Prince Waldburg zu Wolfegg-Waldsee of Wolfegg, Germany, and only this copy is known to exist. It had been carelessly mounted on coarse linen, and was attached to an oaken stick, about which it was rolled:

For the purpose of reproduction and preservation it became necessary to remove the torn linen backing that the eighteen sheets might be restored, in a measure at least, to their former condition. This difficult work was accomplished in a masterly manner by the distinguished Librarian of the Vatican Library, Doctor Franz Ehrle, S.J.

The excellence of the photographic negatives, made with the greatest care, under the direct supervision of Professor Fischer, in Feldkirch, Austria, has rendered it possible to bring out in the reproduction every detail as in the original.

Adorned by six large and by more than forty small engraved pictures which fill the border and the spaces not taken by the two great hemispheres, this map is of no less significance as a cartographical masterpiece than as a masterpiece of engraving. The document is one rich in geographical record of mountains, rivers, local and regional names, and in its legends, which are numerous. This reproduction will be of great interest to specialists, collectors, and students of American history.

The map is issued in eighteen loose sheets, in a neat portfolio, with a brief descriptive text and key map. Among the maps to be published in the series are the Canerio, the Juan de la Cosa, the Sebastian Cabot, the Paris Portuguese, the Oliveriana, the Catalan Map of 1457, and others of the fifteenth, sixteenth, and seventeenth centuries.

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## NEW MAPS.

### AFRICA.

AFRICA.—Die Eisenbahnen Afrikas. Five Maps on one Sheet: Algiers and Tunis, scale 1:8,000,000, or 126.2 statute miles to an inch; West Africa, Congo Basin, Northeast Africa, and South Africa, scale 1:25,000,000, or 394.5 statute miles to an inch. *Deutsche Rundschau für Geog. und Statistik*. Vol. 29, No. 8, Vienna, 1907.

The map is designed to show the present development of railroad-building in Africa. The railroads are shown in red. On the whole, the delineation is well done, but in some respects is not quite up to date. No part of the Cape to Cairo Railroad, north of Victoria Falls, is shown as completed, and the railroad between Stanleyville and Ponthierville, now in operation, is indicated merely as projected.